July 14, 2010

Paula Call
U.S. Department of Energy
Richland Operations Office
P.O. Box 550, A7-75
Richland, WA 99352
<100NRPP@ri.gov>

RE: Public Comment on Groundwater Barrier, Central Plateau Waste Sites, Management of Purgewater from Groundwater Activities and Proposed Permeable Reactive Barrier on 100-NR-2 Operable Unit.

Dear Ms. Call,

Thank you for the opportunity to comment on the most ambitious mission of the U.S. Department of Energy, dealing with the environmental legacy of the Cold War national defense activities. I have designed and developed a plan to recycle municipal wastes to more beneficial uses to assist in the clean up activities. Let me introduce you to the science and technology that I believe can accomplish this mission.

The U.S. Department of Agriculture, Natural Resources Conservation Service, and related agencies, have been investigating the role of soil fungus in the biology of arid lands similar to those at the Hanford Site. An example of this research is a report published by investigator Jerry Barrow of the USDA-ARS Jornada Experimental Range in Las Cruces, New Mexico. He describes how mycorrhizal fungi link root cells to soil particles with microscopic sized plysaccharide structures exhumed by the fungi. Sand grains are bound to a root by the hyphae from endophytes (similar to mycorrhizae) and by the polysaccharides secreted by the plant and the fungi. Other investigators at universities in the United Kingdom have demonstrated the ability of fungi to sequester heavy metal radioactive particles and other radioactive elements within their cell structures. Apparently fungi use the disintegration energy as a life source, binding these contaminants to vadose zone soil particles, thereby reducing the migration of radioactive contaminants into the groundwater.

It has been estimated that over 1.5 million species of fungus proliferate our planet, and are one of the oldest living species, found even at great depths in the earth, much to the amazement of investigators. All aerobic life forms, including fungi, require carbon, nitrogen, and oxygen, plus 20 or more essential micro-nutrients to thrive. All of these essential nutrients may be produced in a compost derived from a natural bilogical decay process, on an industrial scale, using municipal solid waste as the carbon source, and wastewater treatment biosolids as the nitrogen source, which also includes the 20 or more micro-nutrients. If composted municipal wastes were used to culture existing soil fungi found in contaminated soils, the these cultures were re-introduced to contaminated sites, this idea may prove to be a long-term solution to a very difficult problem.

The Tri-Cities wastes can produce an estimated 3,000 tons per month of compost. My idea is to form a consortium between the local Conservation District and units of local government responsible for waste disposal, and a public benefit corporation to operate, maintain and train and educate people about the use of the products and services that this new industry will provide to the county and the Hanford Site.

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Paula Call
RE: Public Comment

Currently I am seeking cost estimates from the major suppliers of existing patented technologies so that I may prepare an engineered cost estimate for a three year projected budget to construct, commission, and operate the facility which I have designed with a new and novel assembly of existing technologies.

The facility that I have I mind will be an employment training center with hands-on job training and education to the local community. The facility will provide union-wage jobs and support children and families with education to create permaculture gardens for local food production. The facility will include supervised employee day care services and a senior center for gardening activities on site.

If the U.S. Department of Energy were to purchase the compost at the full value of production, including royalties to the patent holders, under say a 40 year contract, financial investors may be interested to impliment this plan. My plan is to propose to the U.S. Department of Energy a method to sequester radioacitve contamination using fungus cultured from the Hanford Site soils in a mixture of composted municipal waste, converted from the nearby Tri-Cities wastes. Strains of soil fungus are known to sequester radioactive contaminants into soil structure to prevent movement through the aquafer.

Several metropolitan areas of similar size the the Tri-Cities are currently manufacturing and marketing composted municipal waste using this proven and reliable technology. Other technologies are available to auto-sort the metals, plastics, and household hazardous wastes by alloy and resin groups. Proper treatment and disposal of hazardous wastes relieves the generators of liablility, and ensures a quality composted product suitable for local food production and re-introduction to area comodity agricutlure producer lands.

Technical documents and drawings to support my proposal are available for your review.

Thank you for the opportunity to comment on proposed clean up activities at the Hanford Site.

Respectfully,

James C. Bruvold, PE
Consulting Mechanical Engineer
Energy and Environmental Sciences
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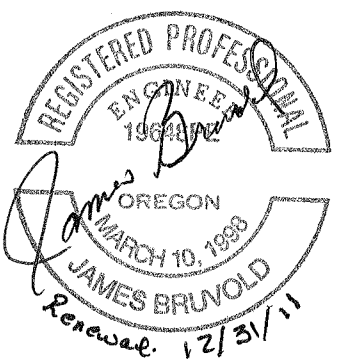
Veneta, OR 97487-0578
jbruvold@efn.org



MYCOLOGY

The study of fungus and mushrooms known as EUMYCOTA and EUMYCETES
Reference: www.Wikipedia – Fungus

Fungus are a large group of eukaryotic arganisms (yeasts and molds) that have cell walls that contain chitin, whereas plants use cellulose. The number of fungi species are estimated to exceed 1.5 million varieties. Soil fungi are microscopic thin tubular threads known as hyphae. In a mass they are called mycelium.

Under the right conditions hyphae can grow so quickly that it has been estimated the amount of hyphae produced in only one day by just one soil fungus would be almost a mile long. Hyphae may be modified by various species in many ways to serve specific functions. The arbuscules of mutualistic microrrhizal fungi serve in nutrient exchange, trapping structures such as constricting rings and adhesive nets. Hyphae can branch through bifucation of a growing tip, or by the emergence of a new tip from an established hyphae.

Published papers on the subject of sequestering radioactive elements into soils with fungi include:

"Role of fungi in the biochemical fate of depleted uranium"
Current Biology 18(9) R375-77 in 2008
By among others Prof. Geoffrey Gadd, Head of the Division of Melecular and Environmental Biology
College of Life Sciences, Dundee University, Scotland

"Fungi as potential bioremediation agents in soil contaminated with heavy radioactive elements"
Biochem Soc. Trans. 1998, November 26 (4) 666-70
By among others Gray SN, Faculty of Science, Technology and Design
University of Luton, UK

"Fungal transformations of uranium oxides"
Environmental Microbiology 9(7) 1696-710

Other sources of information may be found at National Center for Biotechnolgy Information
National Institutes for Health, Division of the National Library of Medicine

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Environmental Restoration

The ability of specific plants and microbes to transpose and accumulate toxins found in our environment opens a whole range of possibilities to use plants and fungi to retain the up until now squandered valuable resources buried in landfills and carelessly discarded. Studies by researchers worldwide have explained how the cooperation of plants and microbes to exude enzymatic substances and their selective action on pathogenic germs, worm eggs and viruses, the shifting of pH value to neutral, and the enrichment of waters with oxygen by living green plants can be achieved.

Photosynthesis serves as the sole energy source for the transformation of sunlight by both the "transformer" and "accumulator" plants to convert toxins such as phenols and cyanide into nontoxic substances belonging to their own body, and in aid in the preservation and restoration of our threatened water economy. Forms of underground soil fungi have demonstrated the ability to sequester radioactive elements into soil structures to prevent movement of contamination through the aquifer. Apparently fungi use radioactive disintegration energy as a life source, storing inside their microscopic hyphae tubular structures heavy radioactive elements, binding their cell structures to soil particles.

A program was underway to decontaminate the soils surrounding the Chernobyl nuclear power plant disaster in the Ukraine by seeding plants identified to have the capability to selectively assimilate radioactive particles. Composting these harvested plants results in concentration and containment of long-lived radioactive particles that would be otherwise unobtainable. A red fungus was photographed growing on the concrete walls inside the reactor building in an environment of 10,000 Rads/hr.

Researchers at the Max-Plank Institute in Germany have conclusively explained the ability of a bulrush species to assimilate and consume pentachlorophenol in high concentrations. Radioactive ponds have been effectively cleaned up using selected native plants at the NASA Stennis Space Center in Alabama. Plants are now being used to clean and purify the air in offices and restaurants, alleviating the "sick building syndrome" more effectively than other methods of treatment.

An understanding of the various biological life processes, and the recycling of essential nutrients through the food web are an essential ingredient for the successful engineering applications of these principles. Over the past many years I have assembled technical documents and research reports on these subjects. I am prepared to share my knowledge and understanding with clients and associates to create a better world for our children.

Technical Documents

"Contributions to the Revitalization of Waters" by Dr. K. Seidel, Max-Plank-Gesselschaft, Germany
"The Ecology of Compost" by Dr. Daniel Dindal, Soil Ecologist, State University of New York
"Nutrient Cycles in Natural Systems" by T. Bott, Stroud Water Research Center, Philadelphia, PA
"Introduction to Microbial Crusts" by P. Shaver, USDA Grazing Lands Technology Institute, KS

Related References

Concentrations of Herbicides in the Willamette River Basin – USGS Phase III Study
Drinking Water Protection Program – Oregon Department of Health
Managing Hazardous Household Waste – Colorado State University Extension Service
Financing Local Projects – League of Oregon Cities

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June, 2010

Curriculum Vitae

2001 OSU Extension Service, "Master Watershed Stewardship Training"
1999 Leage of Oregon Cities, "Land Use Planning for Elected Officials"
1998 OSU Extension Service, "Watershed Stewardship Training – Curriculum & Applications"
1998 Erosion Control Technology Council, "Green Engineering – Design Principles & Applications"
1997 League of Oregon Cities, "Beyond Basics", advanced training for elected officials
1993 CSU Extension Service, "Managing Hazardous Household Wastes", Durango, Colorado
1987 Permaculture Institute, 2-month internship with Jerome Osentowski, Basalt, Colorado
1979 Edmond's Community College, Everette WA, Instructor, "Introduction to Heavy Construction"
1971 Martin Marietta Institute, "High Vacuum Technology" and "Dimensionless Analysis"
1967 Boeing Company Continuing Education: "Physics of Deep Space Solar Radiation"
1967 North Dakota State University, College of Engineering, Bach. Sci. Mechanical Engineering
1964 University of Minnesota, Physics & Chemistry, College of Science, Literature & Arts 64 cr. hr.

Civic Involvement

Chair, City of Veneta Planning Commission, 8 years
Associate Dirctor, Upper Willamette Soil & Water Consrvation District, 14 years
Representative, Lane County Solid Waste Resource Recovery Advisory Committee, 12 years
Founding Member, Long Tom River Watershed Council, 14 years
Volunteer, US Corps of Engineers, Citizen Lake Watch Water Quality Monitoring, 2 years
Advisory Board, Fern Ridge Family Resource Connection for Children and Families, 2 years

Professional Associations

Senior Member, Association of Energy Engineers, 1984
Member, Union of Concerned Scientists, 1990
Published Member Int. Solar Energy Society, "Predicting Thermosyphon Heat Transfer"

Carrier History

2001 **Consulting Engineer**, Energy and Environmental Sciences, Veneta Oregon
Developed plan to convert municipal wastes into more beneficial products.

1993 **Corporate Officer**, Sun Ray's Mechanical Contractors, Inc. Pagosa Springs, Colorado
Plumbing & Heating contractor for residential, commercial, and public buildings.

1987 **Construction Inspector**, Denver Stapleton International Airport Terminal Expansion Project
Computer EMS installation, served Airport Security, Fire Alarm and HVAC

1980 **Balance and Test Engineer**, BC&S Consulting Engineers, Seattle, Washington
Hospital HVAC start-up, Schools & Hospitals Energy Auditor Training Seminars

1974 **Solar Simulation Test Engineer**, Martin Marietta Deep Space Environment Simulation Lab
Test Conductor for flight hardware on Skylab and Viking Mars Lander programs.

1968 **Research Engineer**, Boeing Aerospace, NASA Johnson Space Center, Houston, Texas
Analyst for Crew & Thermal Test Operations, Deep Space Environment Simulation Lab
During Apollo 8 and Apollo 11 Vehicle and Crew Training Acceptance Tests.

July 14, 2010

Washington State Governor Chris Gregoire
Office of the Governor
416 Sid Snyder Ave. SW, Suite 200
P.O. Box 40002
Olympia, WA 98504-0002
c/o Jill Satran, Deputy Chief of Staff

Dear Governor Gregoire,

I need your help to recycle municipal wastes to more beneficial uses to facilitate the clean up of the Hanford Superfund Site. I would like to introduce an idea to the Washington State Conservation Commission regarding a plan that I have developed. The plan involves the cooperation between the Benton County Conservation District and units of local government responsible for municipal waste disposal for the purpose of manufacturing and marketing a fertilizer and soil amendment to the U.S. Department of Energy at the Hanford Site.

I am requesting that you urge the Commission to give consideration to my proposal and offer whatever other support is available from your office to support the mission of the U.S. Department of Energy.

Dealing with the environmental legacy of the Cold War national defense activities is the most ambitious mission of the Department of Energy. Cleaning up contaminated sites and disposing of radioactive waste left behind as a byproduct of nuclear weapons production is the monumental task of the Department of Energy. These efforts include site closure activities, disposition of nuclear materials and waste, and science and technology research to facilitate the environmental clean up.

The USDA-Natural Resources Conservation Service and related agencies have been investigating the role of soil fungus in the biology of arid lands similar to those at the Hanford Site. An example of this research is a report published by investigator Jerry Barrow of the USDA-ARS Jornada Experimental Range in Las Cruces, New Mexico. He describes how mycorrhizal fungi link root cells to soil particles with microscopic sized polysaccharide structures exhumed by the fungi. Sand grains are bound to root by hyphae from endophytes (similar to mychorrhizae) and by the polysaccharides secreted by the plant and the fungi. Other investigators in the United Kingdom have demonstrated the ability of fungi to sequester heavy metal radioactive particles and other radioactive elements within their cell structures.

Apparently fungi use the disintegration energy as a life source, binding these contaminants to vadose zone soil particles, thereby reducing the migration of radioactive contaminants into the groundwater. It has been estimated that over 1.5 million species of fungi proliferate our planet, and are one of the oldest living species, found even at great depths in the earth, much to the amazement of investigators.

All aerobic life forms, including fungi, require carbon, nitrogen, and oxygen, plus 20 or more essential micro-nutrients to thrive. All of these essential nutrients may be produced in a compost derived from a natural biological decay process, on an industrial scale, using municipal solid waste as the carbon source and wastewater treatment biosolids as the nitrogen source, which also includes the 20 or more essential micro-nutrients.

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Governor Gregoire
Recycling Municipal Waste

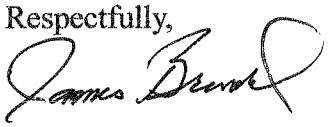
An estimated 3,000 tons per month of compost could be produced from the municipal wastes generated in the Tri-Cities located nearby to the Hanford Site. If this compost were used to culture existing soil fungus found in Hanford's contaminated soils, and these cultures were re-introduced to the contaminated sites, this idea may prove to be a long-term solution to a very difficult problem.

Please encourage the Conservation Commission and your Department of Ecology to peer review the proposal that I have submitted to Ms. Paula Call at the Hanford Site Office of River Protection in Richland Washington in response to a request from her office to submit Public Comment on current clean up activities at the Hanford Site.

Enclosed for your review is a copy of my submission to Ms. Call explaining in more detail my proposal to the U.S. Department of Energy to facilitate clean up activities. Other technical documents and drawings to support my proposal are available upon your request.

Thank you for your consideration.

Respectfully,



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